

Skin preparation for osteosynthesis of open tibia fractures



Critical points

1. The patient develops allergic reactions.
Action:
 - Read information on patient allergies (and ask the patient, if possible) before skin preparation.
2. The skin preparation causes complications such as burns, etc.
Action:
 - Avoid pooling of disinfection liquid (in skin folds, under the patient, around and under the tourniquet, near and under the electrodes).
3. The skin preparation is not performed correctly and might cause an infection.
Action:
 - Follow the correct prepping process using an aseptic technique (from-clean-to-dirt, for open fractures the from-out-to-in technique is used).
 - Respect the following steps: first washing out, second irrigation, third skin preparation.

Note

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Potential allergies of the patient are checked before skin preparation.

For open fractures the technique "from-out-to-in" is carried out.

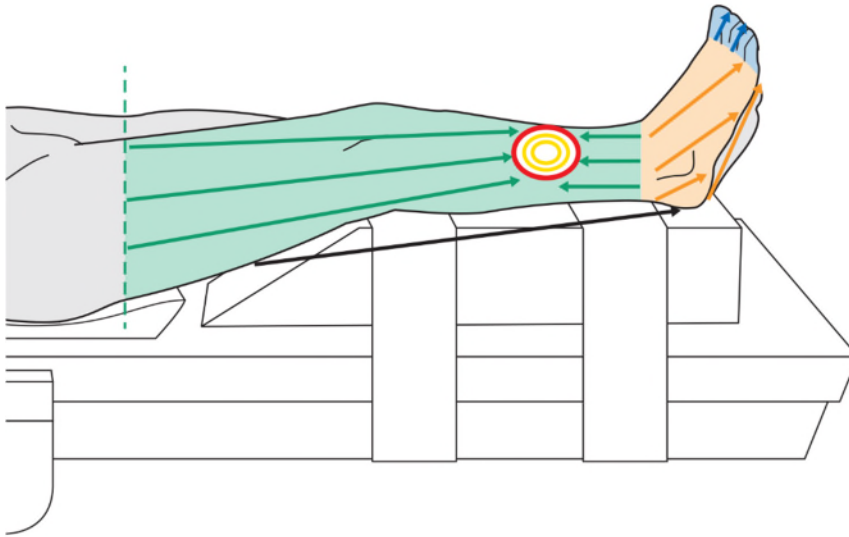







Fig 1 Disinfection procedure:

1. Skin; towards the wound 
2. Wound; circular from out to in 
3. Anterior side of the foot (excluding toes) and plantar 
4. Toes and space between digits 
5. Dorsal side of the leg: from proximal to distal, finishing with plantar 

Procedure

This is a suggested procedure. Please follow the guidelines and instructions of your hospital.

Good understanding and optimal collaboration of all team members is crucial during patient preparation, eg, skin prepping, and will lead to an optimal outcome.

1. Prepare the materials on a sterile surface of a side table.
 - For the washing-out procedure and irrigation:
 - Big basin with saline solution (NaCl) and neutral soap
 - Sterile single-use brush
 - Several large sterile drapes (to be placed under the extremity) or arthroscopy drape with large plastic collection bag for liquids (as used in this procedure)
 - Large wound sponges
 - Pap test for bacteriology
 - Sterile single-use clipper (if required)
 - Sterile gloves
 - Perfusion set with big lumen (eg, cystoscopy tube)
 - NaCl: 3 L (if possible, on body temperature)
 - Aspiration with big tube
 - Sterile scissors (for removal of wound drapes, if required)
 - Sterile water resistant drapes used as provisional wound drapes

Note

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Wound preparation for surgery is done in three steps:

1. Washing out
2. Irrigation
3. Skin preparation

- For skin preparation:
 - Stainless steel cup
 - Antimicrobial agent
 - Sterile sponges (minimum eight)
 - Sponge-holding forceps
 - Sterile drape for leg
 - Sterile towel (to hold the foot)
 - Sterile gloves (for runner and resident)
 - Hand disinfectant
 - If required, two Pap tests (bacteriology)
 - Prepare unsterile material:
 - Camera
 - Aspiration (and, if available, floor aspiration)
 - Holder for perfusion
2. Discuss antibiotic prophylaxis before start (30 minutes before incision, since at that moment it reaches its highest peak.)
 3. Ask patient (if possible), if they have any allergies (refer to "sign-in" procedure of the Surgical Safety Checklist).
 4. Install anesthetic frame.
 5. Remove the sterile wound protection drapes and prepare the patient. Expose only the area to be prepped to ensure privacy and warmth of the patient.
 6. Lift the extremity and hold it under traction. The person lifting the leg has to wear gloves for their own protection.
 7. Position the leg on a drape which absorbs liquids. If available, an arthroscopy drape with collection bag can be used.
 8. Photograph the wound
 9. Use of Pap test for bacteriology.
10. **Step 1:** Washing out (done by runner or surgeon wearing personnel protective equipment (PPE))
 - Resident (with sterile gown) holds leg up and under traction.
 - Soap the wound area largely with sterile sponges soaked in NaCl 0.9%.
 - Remove carefully all visible dirt particles from the wound. First all dirt is removed from the extremity and last from the foot to avoid contamination of the wound with spurs (Clostridium). A brush can be used.
 11. **Step 2:** Irrigation
 - Rinse the leg and the wound with NaCl 0.9% to remove rests of soap. Irrigate under medium pressure. Recommended are large volumes with low pressure to avoid additional tissue injury. Gravity flow with large-bore cystoscopy tubing is a well-accepted method.
 - Dry leg and wound with sponge.
 - Wrap the leg or place the sterile drape over the wound to protect it until skin preparation.
 12. **Step 3:** Skin preparation
 - Remove the protective wound drape. The leg is held up and kept under traction.
 - Place a new sterile drape (which absorbs all liquids) under the leg.
 - Surgeon and resident are gowned and wear double gloves.
 - If necessary, one or two Pap tests are done.
 - The anterior side of the leg is disinfected three times with different sponges, which are soaked in a non-alcoholic disinfectant. Do not use alcohol and povidone-iodine products as those are cell toxic.
 - The procedure from-out-to-in is carried out. Peripheral intact skin is prepared before the open wound disinfected. Foot and toes are disinfected last.
 - The resident lifts the leg up and holds it under traction by grasping the foot and toes with a sterile

towel. A sterile drape is positioned under the leg. This is to avoid contamination of the resident's gown. The table is lowered or a step is used.

- The posterior side of the leg is disinfected in a quick tempo. This is repeated three times.

13. Remove all used material and drapes and position a clean sterile drape under the leg.

Guidelines for recommended practice

1. **Check that the skin is clean.** A preoperative bath or shower is recommended.
2. Pooling of liquids is avoided by **protecting the surrounding areas** with absorbent sheets.
3. Only **approved agents** which have immediate, cumulative, and persistent action are used. **Correct use**, as recommended by the manufacturer, is strongly advised:
 - Friction and pressure increase the effect against resident and transient micro-organisms.
 - The antimicrobial agent is air-dried.
4. The **disinfection procedure** is performed:
 - With sterile supplies and gloves.
 - Moving from the incision area to the periphery in case of aseptic procedure.
 - Without touching non-sterile areas such as tables, sheets, etc.

Once the boundaries of the prepping area are reached, the sponge must be discarded, as it cannot be brought back over the clean area. Repeat this procedure two more times.

5. **Contaminated areas require special attention** and should be prepped last:
 - The inside-out technique is carried out for closed fractures.
 - The outside-in technique is carried out for open fractures, wounds, and other contaminated areas.
6. Remove all absorbent sheets without contaminating the disinfected area.

Reference(s)

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- **Center for disease control and prevention [Internet].** Guideline for Prevention of Surgical Site Infection. 1999. [Accessed November 2013]. Available from: http://www.cdc.gov/hicpac/pdf/guidelines/SSI_1999.pdf.
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- **WHO [Internet].** Surgical Safety Checklist. 2009. [Accessed January 2014.] Available from: http://www.who.int/patientsafety/safesurgery/tools_resources/SSSL_Checklist_finalJun08.pdf.